

Amendment under 37 C.F.R. §1.114
Attorney Docket No. 062680
Application No. 10/583,779

AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions of claims in the application.

1. (Currently Amended): A photocatalyst sheet comprising:
 - a substrate made of synthetic fiber,
 - a coated layer made of a resin or a rubber coated on both sides of said substrate, and
 - a photocatalyst-containing layer coated on at least one side of said coated layer,
wherein said photocatalyst-containing layer contains a resin or a rubber, and apatite-coated photocatalyst particles having low water solubility,
said photocatalyst particle contains titanium oxide, and said apatite is either of apatite hydroxide, apatite carbonate, apatite fluoride or apatite chloride or a mixture thereof,
the particle diameter of said photocatalyst particles is 1 nm to 100 nm,
the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %,
the coating quantity of said apatite coated on said photocatalyst particles is such that the weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the case that when~~ ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said photocatalyst sheet,
the water contact angle of said photocatalyst sheet surface is 130 degrees or less,
whereby said coated layer can be peeled from said substrate when a pair of said photocatalyst sheets are mutually thermally welded to form a welded part and when said welded part is peeled off by a peeling test at the rate of 50 mm/min.

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2. (Currently Amended): A photocatalyst sheet comprising:

a substrate made of polyester fiber,

a coated layer made of polyvinyl chloride resin coated on both sides of said substrate, and

a photocatalyst-containing layer coated on at least one side of said coated layer,

wherein said photocatalyst-containing layer contains polyvinyl chloride resin, acrylic resin, and apatite-coated photocatalyst particles having low water solubility,

said photocatalyst particle contains titanium oxide, and said apatite is either of apatite hydroxide, apatite carbonate, apatite fluoride, or apatite chloride, or a mixture thereof,

the particle diameter of said photocatalyst particles is 1 nm to 100 nm,

the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %,

the coating quantity of said apatite coated on said photocatalyst particles is such that the weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the case that when~~ ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said photocatalyst sheet,

the water contact angle of said photocatalyst sheet surface is 130 degrees or less,

whereby said coated layer can be peeled from said substrate when a pair of said photocatalyst sheets are mutually thermally welded to form a welded part and when said welded part is peeled off by a peeling test at the rate of 50 mm/min.

3. (Currently Amended): A photocatalyst sheet comprising:

a substrate made of inorganic fiber,

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a coated layer made of fluorocarbon resin coated on both sides of said substrate, and
a photocatalyst-containing layer coated on at least one side of said coated layer,
wherein said photocatalyst-containing layer contains fluorocarbon resin and apatite-
coated photocatalyst particles having low water solubility,

said photocatalyst particle contains titanium oxide, and said apatite is either of apatite
hydroxide, apatite carbonate, apatite fluoride, or apatite chloride, or a mixture thereof,
the particle diameter of said photocatalyst particles is 1 nm to 100 nm,
the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing
layer is 10 – 40 weight %,

the coating quantity of said apatite coated on said photocatalyst particles is such that the
weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the case that when~~
ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said
photocatalyst sheet,

the water contact angle of said photocatalyst sheet surface is 130 degrees or less,
whereby said coated layer can be peeled from said substrate when a pair of said
photocatalyst sheets are mutually thermally welded to form a welded part and when said welded
part is peeled off by a peeling test at the rate of 50 mm/min.

4. (Withdrawn): A photocatalyst sheet comprising a substrate made of glass fiber, a
coated layer made of PTFE coated on both sides of said substrate; and a photocatalyst-containing
layer coated on at least one side of said coated layer, characterized in that
said photocatalyst-containing layer contains fluorocarbon resin being either one of PTFE,

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FEP, or PFA and apatite-coated photocatalyst particles,

the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %, and

the peeling rate of said welded part from said substrate is 50 mm/min when said photocatalyst sheets are mutually thermally welded.

5. (Previously Presented): The photocatalyst sheet as set forth in any one of claims 1 – 4, characterized in that the apatite-coated photocatalyst particles fixed in said photocatalyst containing layer have parts exposed from the surface of said photocatalyst containing layer.

6. (Previously Presented): The photocatalyst sheet as set forth in any one of claims 1-4, characterized in that said apatite-coated photocatalyst particles are the photocatalyst particles either a part of the surface of which is coated with apatite, or a whole surface of which is coated with porous apatite.

7. (Cancelled)

8. (Previously Presented): The photocatalyst sheet as set forth in any one of claims 1 - 4, characterized in that said photocatalyst particles are either or both of an ultraviolet light responsive type and a visible light responsive type.

9. (Cancelled)

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10. (Withdrawn): The photocatalyst sheet as set forth in claim 1, characterized in that said substrate is made of either of such synthetic fibers as polyamide fiber, polyaramide fiber, polyester fiber, polyvinyl chloride fiber, polyvinylidene chloride fiber, acrylic fiber, polyvinyl alcohol fiber, polypropylene fiber, polyethylene fiber, and others.

11. (Previously Presented): The photocatalyst sheet as set forth in claim 1, characterized in that said apatite-coated photocatalyst particles are fixed with the resin or rubber constituting said photocatalyst-containing layer.

12. (Cancelled)

13. (Previously Presented): The photocatalyst sheet as set forth in claim 1 or 11, characterized in that said resin is either of polyvinyl chloride, polyethylene, polypropylene, ethylene vinyl acetate copolymer, polyurethane, fluorocarbon, and polystyrene resins, acrylonitrile-butadiene-styrene copolymer, polyamide, acrylic, polycarbonate, methylpentene resins, or the mixture thereof and said rubber is either of chloroprene, polyethylenechlorosulfonate, natural, butadiene, styrene, butyl, nitrile, acrylic, urethane, silicone, fluorocarbon, or ethylenepropylene rubbers .

14. (Previously Presented): The photocatalyst sheet as set forth in claim 3, characterized in that said fluorocarbon resin is either of polytetrafluoroethylene (PTFE), tetrafluoroethylene-hexa-fluoropropylene copolymer (FEP), tetrafluoroethylene-perfluoroalkylvinylether copolymer

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(PFA), polyvinyl fluoride (PVF), or polyvinylidene fluoride (PVDF).

15. (Withdrawn): A method of welding photocatalyst sheets comprising
a substrate made of polyester fiber,
coated layers made of polyvinyl chloride coated on both sides of said substrate, and
a photocatalyst-containing layer coated on at least one side of said coated layer,
characterized in that
said photocatalyst-containing layer contains polyvinyl chloride and acrylic resins, with
apatite-coated photocatalyst particles fixed thereon,
the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing
layer is 10 – 40 weight %,
the surfaces to be welded of said photocatalyst sheets are mutually fitted without
removing photocatalyst-containing layers and welded together, and
the peeling rate of said welded part from said substrate is 50 mm/min when said
photocatalyst sheets are mutually thermally welded.

16. (Withdrawn): The method of welding photocatalyst sheets comprising
a substrate made of glass fiber,
a first coated layers made of PTFE coated on both sides of said substrate, and
a photocatalyst-containing layer coated on at least one side of said first coated layer,
characterized in that
said photocatalyst-containing layer contains a fluorocarbon resin being either one of

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PTFE, FEP, or PFA, with apatite-coated photocatalyst particles fixed thereon,

the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %,

the surfaces to be welded of said photocatalyst sheets are mutually fitted without removing photocatalyst-containing layers and welded together, and

the peeling rate of said welded part from said substrate is 50 mm/min when said photocatalyst sheets are mutually thermally welded.

17. (Withdrawn): The method of welding photocatalyst sheets as set forth in claim 16, characterized in that in said photocatalyst-containing layer, the ratio of apatite-coated photocatalyst particles to the resin or rubber fixing said apatite-coated photocatalyst particles is 10 - 60 weight %.

18. (Withdrawn): A method of manufacturing photocatalyst sheets comprising a substrate made of polyester fiber and coated layers made of polyvinyl chloride coated on both sides of said substrate, and the outermost layer of at least one side of said coated layer is made a photocatalyst-containing layer by fixing apatite-coated photocatalyst particles, characterized in that said photocatalyst-containing layer contains polyvinyl chloride resin and acrylic resin, said photocatalyst-containing layer is formed by coating the dispersion containing apatite-coated photocatalyst particles,

said apatite-coated photocatalyst particles are fixed with polyvinyl chloride resin and

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acrylic resin which constitute said photocatalyst-containing layer,

the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %, and

the peeling rate of said welded part from said substrate is 50 mm/min when said photocatalyst sheets are mutually thermally welded.

19. (Withdrawn): A method of manufacturing photocatalyst sheets comprising
 - a substrate made of glass fiber and
 - coated layers made of PTFE coated on both sides of said substrate, and
 - the outermost layer of at least one side of said coated layer is made a photocatalyst-containing layer by fixing apatite-coated photocatalyst particles, characterized in that
 - said photocatalyst-containing layer contains fluorocarbon resin being either one of PTFE, FEP, or PFA,
 - said photocatalyst-containing layer is formed by coating the dispersion containing apatite-coated photocatalyst particles,
 - said apatite-coated photocatalyst particles are fixed with said fluorocarbon resin which constitutes said photocatalyst-containing layer,
 - the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %, and
 - the peeling rate of said welded part from said substrate is 50 mm/min when said photocatalyst sheets are mutually thermally welded.

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20. (Withdrawn): The method of manufacturing photocatalyst sheets as set forth in claim 18, characterized in that said dispersion comprises polycinyl chloride resin and acrylic resin, the apatite-coated photocatalyst particles, and organic solvents.

21. (Withdrawn): The method of manufacturing photocatalyst sheets as set forth in claim 19, characterized in that said dispersion comprises fluorocarbon resin being either one of said PTFE, FEP, or PFA, the apatite-coated photocatalyst particles, and water.

22. (Withdrawn): The photocatalyst sheet as set forth in claim 3, characterized in that said substrate is made of glass fiber, silica fiber, basalt fiber, or other inorganic fiber.

23. (Withdrawn): The welding method of photocatalyst sheets as set forth in claim 15 or 16, characterized in that the resins present on said surfaces to be welded are mutually thermally welded.

24. (Currently Amended): A photocatalyst sheet comprising two or more photocatalyst sheets mutually welded to each other, each of said two or more photocatalyst sheets comprising:
a substrate made of synthetic fiber,
a coated layer made of a resin or a rubber coated on both sides of said substrate, and
a photocatalyst-containing layer coated on at least one side of said coated layer,
wherein said photocatalyst-containing layer contains a resin or a rubber, and apatite-coated photocatalyst particles having low water solubility,

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said photocatalyst particle contains titanium oxide, and said apatite is either of apatite hydroxide, apatite carbonate, apatite fluoride, or apatite chloride, or a mixture thereof,

the particle diameter of said photocatalyst particles is 1 nm to 100 nm,

the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %,

the coating quantity of said apatite coated on said photocatalyst particles is such that the weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the ease that when~~ ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said photocatalyst sheet,

the water contact angle of said photocatalyst sheet surface is 130 degrees or less,

whereby said coated layer can be peeled from said substrate when a pair of said photocatalyst sheets are mutually thermally welded to form a welded part and when said welded part is peeled off by a peeling test at the rate of 50 mm/min.

25. (Currently Amended): A photocatalyst sheet comprising two or more photocatalyst sheets mutually welded to each other, each of said two or more photocatalyst sheets comprising:

a substrate made of polyester fiber,

a coated layer made of polyvinyl chloride resin coated on both sides of said substrate, and

a photocatalyst-containing layer coated on at least one side of said coated layer,

said photocatalyst particle contains titanium oxide, and said apatite is either of apatite hydroxide, apatite carbonate, apatite fluoride, or apatite chloride, or a mixture thereof,

wherein said photocatalyst-containing layer contains polyvinyl chloride resin, acrylic

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resin, and apatite-coated photocatalyst particles having low water solubility,
the particle diameter of said photocatalyst particles is 1 nm to 100 nm,
the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing
layer is 10 – 40 weight %,
the coating quantity of said apatite coated on said photocatalyst particles is such that the
weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the case that when~~
ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said
photocatalyst sheet,
the water contact angle of said photocatalyst sheet surface is 130 degrees or less,
whereby said coated layer can be peeled from said substrate when a pair of said
photocatalyst sheets are mutually thermally welded to form a welded part and when said welded
part is peeled off by a peeling test at the rate of 50 mm/min.

26. (Currently Amended): A photocatalyst sheet comprising two or more photocatalyst
sheets mutually welded to each other, each of said two or more photocatalyst sheets comprising:
a substrate made of inorganic fiber,
a coated layer made of fluorocarbon resin coated on both sides of said substrate, and
a photocatalyst-containing layer coated on at least one side of said coated layer,
wherein said photocatalyst-containing layer contains fluorocarbon resin and apatite-
coated photocatalyst particles having low water solubility,

said photocatalyst particle contains titanium oxide, and said apatite is either of apatite
hydroxide, apatite carbonate, apatite fluoride, or apatite chloride, or a mixture thereof,

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the particle diameter of said photocatalyst particles is 1 nm to 100 nm,
the ratio of said apatite-coated photocatalyst particles to said photocatalyst-containing layer is 10 – 40 weight %,
the coating quantity of said apatite coated on said photocatalyst particles is such that the weight loss ratio of the whole of said photocatalyst sheet is 10% or less ~~in the case that when~~ ultraviolet light of intensity of 18 mW/cm² is irradiated for one hour on the surface of said photocatalyst sheet,
the water contact angle of said photocatalyst sheet surface is 130 degrees or less,
whereby said coated layer can be peeled from said substrate when a pair of said photocatalyst sheets are mutually thermally welded to form a welded part and when said welded part is peeled off by a peeling test at the rate of 50 mm/min.